**JAVA WEEK 2 SUMMARY**

**Day 1 – Git**

**Git Version Control –** A version control system is a software that tracks changes to a file or set of files over time so that you can recall specific versions later. It also allows you to work together with other programmers or developers. The version control system is a collection of software tools that help a team to manage changes in the source code. It uses a special kind of database to keep track of every modification to the code. There are several git hosting services (remote repositories) in the market. Some are free and some are commercial. These include GitHub, Bitbucket and Gitlab.

**What is Git? -** Git is an open-source distributed version control system. It is designed to handle minor to major projects with high speed and efficiency. It is developed to co-ordinate the work among the developers. The version control allows us to track and work together with our team members at the same workspace. Git is the foundation of many services like GitHub and GitLab, but you can use Git without using any other Git services. Git can be used privately and publicly. Git is easy to learn and has fast performance.

**Benefits of using Git –** A version control application allows you to keep track of all the changes that you make in the files of your projects. Every time you make changes in the files of an existing project, you can push those changes to a repository. Other developers are allowed to pull your changes from the repository and continue to work with the updates that you added to the project files.

The major benefits of Git are:

* Saves Time - Git is lightning fast technology. Each command takes only a few seconds to execute so you can save a lot of time as compared to logging into a GitHub account and finding out its features.
* Offline working - One of the most important benefits of Git is that it supports offline working. If you are facing internet connectivity issues, it will not affect your work. In Git, you can do almost everything locally.
* Undo mistakes – One additional benefit of Git is that you can undo mistakes.
* Track the changes – Git facilitates with some exciting features such as Diff, Log, and Status, which allows you to track changes so you can check the status, compare your files or branches.

**Day 2 – Git Tools and Packages**

**Git Tools –** Git comes with some tools like Git Bash and Git GUI to provide the interface between machine and user. It supports inbuilt as well as third party tools.

Git Package Tools - Git provides powerful functionality tools such as commands, command line, Git GUI.

GitBash - Git Bash is an application for the Windows environment. It is used as Git command line for windows. Git Bash provides an emulation layer for a Git command-line experience. Bash is an abbreviation of Bourne Again Shell. Git package installer contains Bash, bash utilities, and Git on a Windows operating system. Bash is a standard default shell on Linux and macOS. A shell is a terminal application which is used to create an interface with an operating system through commands.

Git Bash Commands - Git Bash comes with some additional commands that are stored in the /usr/bin directory of the Git Bash emulation. Git Bash can provide a robust shell experience on Windows. Git Bash comes with some essential shell commands like Ssh, scp, cat, find. Git Bash also includes the full set of Git core commands like git clone, git commit, git checkout, git push, and more.

Git GUI - Git GUI is a powerful alternative to Git BASH. It offers a graphical version of the Git command line function, as well as comprehensive visual diff tools. You can access it by simply right-clicking on a folder or location in windows explorer. Also, you can access it through the command line by typing the following command: $ git gui

Git facilitates with some built-in GUI tools for committing (git-gui) and browsing (gitk), but there are many third-party tools for users looking for a platform-specific experience.

Gitk - gitk is a graphical history viewer tool. It's a robust GUI shell over git log and git grep. This tool is used to find something that happened in the past or visualize your project's history. Gitk can invoke from the command-line. Just change directory into a Git repository, and type: $ gitk [git log options]

**Git terminology –** Git has vast terminology and jargon, which can often be difficult for new users, or those who know Git basics but want to become Git masters. Lets look at the commonly used Git terms:

* Branch - A branch is a version of the repository that diverges from the main working project. It is an essential feature available in most modern version control systems. A Git project can have more than one branch. We can perform many operations on Git branch-like rename, list, delete, etc.
* Checkout - In Git, the term checkout is used for the act of switching between different versions of a target entity. The git checkout command is used to switch between branches in a repository.
* Cherry-Picking - Cherry-picking in Git is meant to apply some commit from one branch into another branch. In case you made a mistake and committed a change into the wrong branch, but do not want to merge the whole branch. You can revert the commit and cherry-pick it on another branch.
* Clone - The git clone is a Git command-line utility. It is used to make a copy of the target repository or clone it. If I want a local copy of my repository from GitHub, this tool allows creating a local copy of that repository on your local directory from the repository URL.
* Fetch - It is used to fetch branches and tags from one or more other repositories, along with the objects necessary to complete their histories. It updates the remote-tracking branches.
* HEAD - It is used to fetch branches and tags from one or more other repositories, along with the objects necessary to complete their histories. It updates the remote-tracking branches.
* Index - The Git index is a staging area between the working directory and repository. It is used as the index to build up a set of changes that you want to commit together.
* Master - Master is a naming convention for Git branch. It's a default branch of Git. After cloning a project from a remote server, the resulting local repository contains only a single local branch. This branch is called a "master" branch. It means that "master" is a repository's "default" branch.
* Merge - Merging is a process to put a forked history back together. The git merge command facilitates you to take the data created by git branch and integrate them into a single branch.
* Origin - In Git, "origin" is a reference to the remote repository from a project was initially cloned. More precisely, it is used instead of that original repository URL to make referencing much easier.
* Pull/Pull Request - The term Pull is used to receive data from GitHub. It fetches and merges changes on the remote server to your working directory. The git pull command is used to make a Git pull.

Pull requests are a process for a developer to notify team members that they have completed a feature. Once their feature branch is ready, the developer files a pull request via their remote server account. Pull request announces all the team members that they need to review the code and merge it into the master branch.

* Push - The push term refers to upload local repository content to a remote repository. Pushing is an act of transfer commits from your local repository to a remote repository. Pushing is capable of overwriting changes; caution should be taken when pushing.
* Rebase - In Git, the term rebase is referred to as the process of moving or combining a sequence of commits to a new base commit. Rebasing is very beneficial and visualized the process in the environment of a feature branching workflow.

From a content perception, rebasing is a technique of changing the base of your branch from one commit to another.

* Remote - In Git, the term remote is concerned with the remote repository. It is a shared repository that all team members use to exchange their changes. A remote repository is stored on a code hosting service like an internal server, GitHub, Subversion and more. In case of a local repository, a remote typically does not provide a file tree of the project's current state, as an alternative it only consists of the .git versioning data.
* Repository - In Git, Repository is like a data structure used by VCS to store metadata for a set of files and directories. It contains the collection of the file as well as the history of changes made to those files. Repositories in Git is considered as your project folder. A repository has all the project-related data. Distinct projects have distinct repositories.
* Stashing - Sometimes you want to switch the branches, but you are working on an incomplete part of your current project. You don't want to make a commit of half-done work. Git stashing allows you to do so. The git stash command enables you to switch branch without committing the current branch.
* Tag - Tags make a point as a specific point in Git history. It is used to mark a commit stage as important. We can tag a commit for future reference. Primarily, it is used to mark a projects initial point like v1.1. There are two types of tags: Light-weighted and Annotated tags.
* Upstream and Downstream - The term upstream and downstream is a reference of the repository. Generally, upstream is where you cloned the repository from (the origin) and downstream is any project that integrates your work with other works. However, these terms are not restricted to Git repositories.
* Git Revert - In Git, the term revert is used to revert some commit. To revert a commit, git revert command is used. It is an undo type command. However, it is not a traditional undo alternative.
* Git Reset - In Git, the term reset stands for undoing changes. The git reset command is used to reset the changes. The git reset command has three core forms of invocation. These forms are as follows: Soft, Mixed and Hard.
* Git Ignore - In Git, the term ignore used to specify intentionally untracked files that Git should ignore. It doesn't affect the Files that are already tracked by Git.
* Git Diff - Git diff is a command-line utility. It's a multi-use Git command. When it is executed, it runs a diff function on Git data sources. These data sources can be files, branches, commits, and more. It is used to show changes between commits, commit, and working tree, etc.
* Git Cheat Sheet - A Git cheat sheet is a summary of Git quick references. It contains basic Git commands with quick installation. A cheat sheet or crib sheet is a brief set of notes used for quick reference. Cheat sheets are so named because the people may use them without no prior knowledge.
* Git Flow - GitFlow is a branching model for Git, developed by Vincent Driessen. It is very well organized to collaborate and scale the development team. Git flow is a collection of Git commands. It accomplishes many repository operations with just single commands.
* Git Squash - In Git, the term squash is used to squash previous commits into one. Git squash is an excellent technique to group-specific changes before forwarding them to others. You can merge several commits into a single commit with the powerful interactive rebase command.
* Git Rm - In Git, the term rm stands for remove. It is used to remove individual files or a collection of files. The key function of git rm is to remove tracked files from the Git index. Additionally, it can be used to remove files from both the working directory and staging index.
* Git Fork - A fork is a rough copy of a repository. Forking a repository allows you to freely test and debug with changes without affecting the original project. Great use of using forks to propose changes for bug fixes. To resolve an issue for a bug that you found, you can: Fork the repository, Make the fix and Forward a pull request to the project owner.